

Date: Tuesday, 12/18/2007 10:45:42 AM  
 User: Kim Johnston

## Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : MOUNTING BRACKET
Job Number : 36395	
Estimate Number : 11796	
P.O. Number :	Part Number : D2523
This Issue : 12/18/2007 S.O. No. :	Drawing Number : D2523 REV A2
Prsht Rev. : NC	Project Number : N/A
First Issue : / / Type : MACHINED PARTS	Drawing Revision : A2
Previous Run : 33047	Material :
Written By :	Due Date : 1/7/2008 Qty: 20 Um: Each
Checked & Approved By : <u>12/07/12/18</u>	
Comment : Est. C 01.04.16 Re format, added DT8560 EC	

## Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	M6061T6B1000X12000	6061-T6 Bar 1.0" x 12.0"
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Comment: Qty.: 1.9031 f(s)/Unit Total: 38.0625 f(s)  
 6061-T6 Bar 1.0" x 12.0"

Material: 6061-T6 (QQ-A-200/8) 1.00" thick

Note: 2 per blank.

Batch

M104719

11.4186 f(s) M106701 → 26.6434 f(s)  
 DSP 08/01/05

2.0	BAND SAW	BAND SAW
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Comment: BAND SAW

Cut blank: 21.75" x 12.00"

DSP 08/01/05

(10)

3.0	HAAS1	HAAS CNC VERTICAL MACHINING #1
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Comment: HAAS CNC VERTICAL MACHINING #1  
 Machine as per folio D2523

DSP 08/01/06

(22)

PTO

4.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE
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Comment: INSPECT PARTS AS THEY COME OFF MACHINE

DSP 08/01/10

(22)

5.0	QC8	SECOND CHECK
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Comment: SECOND CHECK

BF

(22)

6.0	SMALL FAB 1	SMALL & MEDIUM FAB RESOURCE 1
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Comment: SMALL &amp; MEDIUM FAB RESOURCE 1

Deburr

Drill holes as per dwg D2523 using DT8560



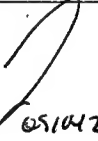
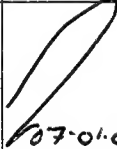


FF 08-01-16

(22)

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D2523 PAR #: JA Fault Category: Prod mact NCR: Yes No DQA: JA Date: 08.01.25  
 QA: N/C Closed: JA Date: 08.01.28

NCR: 36395		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
08/01/07	3.0	2 first parts, 1/2" Rougher pulled out of the holder/collet	 08.01.07	Reassemble tool in holder/collet. ensure tool is secure. scrub, destroy & replace Qty 2 B <u>106701</u>	DJP 08/01/07	 08/01/08	 08.01.07	 07-01-07
08/01/09	30	2 parts have the Dim. of 0.125" floor thickness of 0.100" PC mat. thickness	UE 08.01.09	Acceptable. See attached calculation	J.L 08/01/09	 08/01/10	UE 08.01.09	 08/01/10

NOTE: Date & initial all entries

Date: Tuesday, 12/18/2007 10:45:42 AM  
User: Kim Johnston

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: MOUNTING BRACKET

Job Number: 36395

Part Number: D2523

Job Number:



Seq. #:

Machine Or Operation:

Description:

7.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

08/01/16

8.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

08-01-7

9.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.1) as per QSI 005 4.3

BR 08-01-23

(22)

10.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

08/01/23

(22X)

11.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: ST 197

08/01/24

(22)

12.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

08.01.25

Job Completion



2008/1/24

W

#15 30 m  
23/01/2008  
S.00001 07.56  
#1 328.3 F  
#2 324.9 F  
B36395  
#15 30 m  
23/01/2008  
08.23  
S.00001

#16 30 m  
23/01/2008  
09.00  
S.00002

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b>	36395
<b>Description:</b> Mounting Bracket		<b>Part Number:</b>	D2523
<b>Inspection Dwg:</b> D2523 <b>Rev:</b> A2		<b>Page 1 of 1</b>	

### FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article      ☐ Prototype

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
Ø0.257	+0.005/-0.000	0.258	✓			
1.076	+/-0.010	1.0765	✓			
1.985	+/-0.010	1.9845	✓			
Ø0.257	+0.005/-0.001	0.258	✓			
9.372	+/-0.010	9.371	✓			
1.035	+/-0.010	1.0365	✓			
Ø0.191	+0.005/-0.000	0.193	✓			
7.546	+/-0.010	7.547	✓			
2.776	+/-0.010	2.775	✓			
2.776	+/-0.010	2.776	✓			
0.875	+/-0.010	0.8725	✓			
R0.125	+/-0.010	0.125	✓			
1.00	+/-0.030	1.010	✓			
R0.125	+/-0.010	0.125	✓			
0.750	+/-0.010	0.747	✓			
0.250	+/-0.010	0.256	✓			
R0.250	+/-0.010	0.250	✓			
0.125	+/-0.010	0.128	✓			
R0.125	+/-0.010	0.125	✓			
R0.063	+/-0.010	0.0625	✓			

<b>Measured by:</b> DSP	<b>Audited by:</b> gmk	<b>Prototype Approval:</b>	N/A
<b>Date:</b> 08/01/07	<b>Date:</b> 08/01/07	<b>Date:</b>	N/A

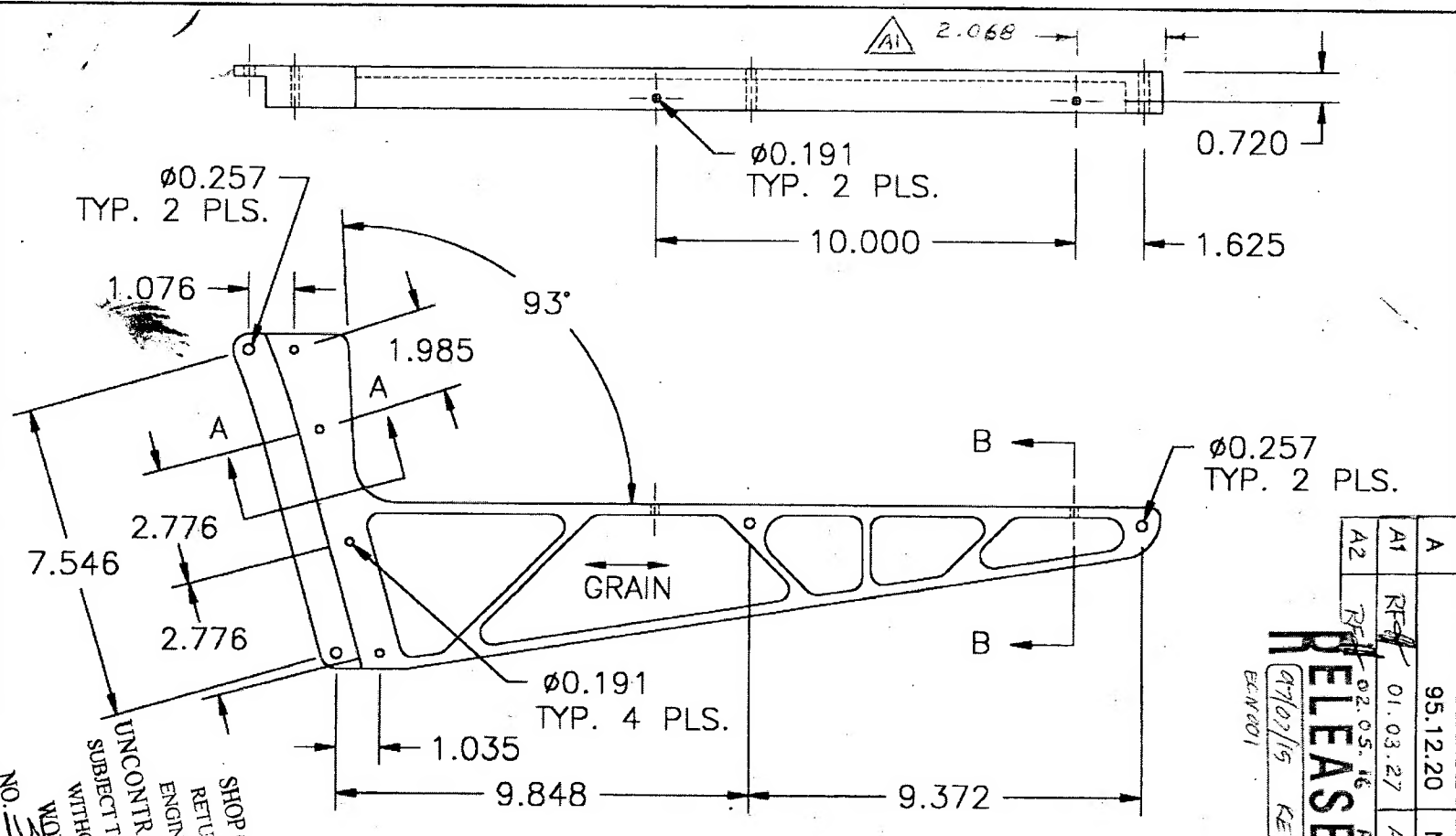
Rev	Date	Change	Revised by	Approved
A	05.02.17	New Issue	KJ/JLM	

**DART**



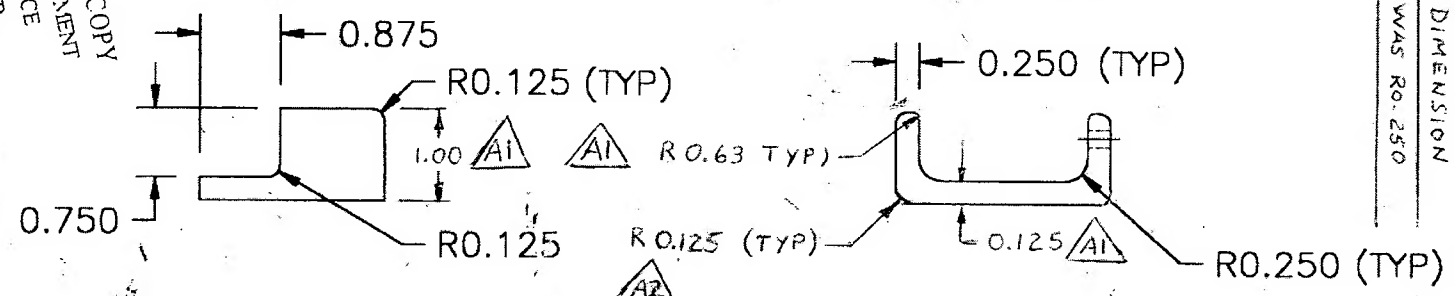
DESIGN	DRAWN BY	DART AEROSPACE LTD VICTORIA INTERNATIONAL AIRPORT, CANADA
CHECKED <i>BW</i>	APPROVED <i>KE</i>	DRAWING NO. D2523
DATE 95.12.20	TITLE MOUNTING BRACKET	REV. A
		SHEET 1 OF 1
		SCALE 1:4
A	95.12.20	NEW ISSUE
A1	01.03.27	ADDED DIMENSION
A2	02.05.16	R0.125 WAS R0.250

**RELEASED**  
07/07/15 KE  
ECN001



SECTION A-A  
SCALE 1:2

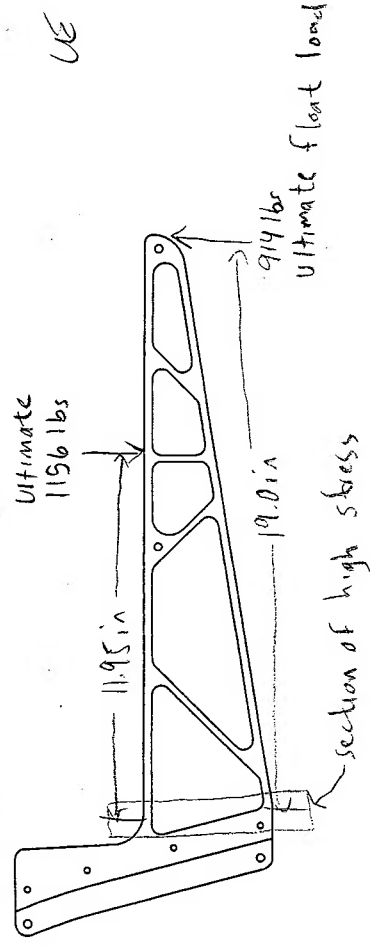
SECTION B-B  
SCALE 1:2



MATERIAL: 6061-T6 QQ-A-200/8 1.00 THICK  
FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1  
POWDER COAT GLOSS WHITE PER DART QSI 005 4.3

UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
RETURN TO  
SHOP COPY  
NO. 36395  
WORK ORDER

UE 08.01.07



Moments:

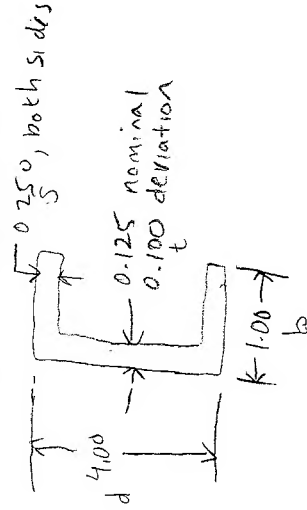
$$M_1 = (1156 \text{ lbs})(11.95 \text{ in}) = 13814 \text{ in}\cdot\text{lbs}$$

$$M_2 = (914 \text{ lbs})(19.0 \text{ in}) = 17366 \text{ in}\cdot\text{lbs}$$

Use higher stress in calculation  $\therefore$  use  $M_2$ .

$$\sigma = \frac{M_c}{I}$$

Cross-Section:



$$I = \frac{bd^3 - h^3(b-t)}{12}$$

$$h = d - 2t = 4.0 - 2(0.25) = 3.5 \text{ in}$$

$$c = \frac{d}{2} = 2.0 \text{ in}$$

$I_n$  = moment of inertia, nominal

$I_d$  = moment of inertia, deviated

$$I_n = \frac{(1.0)(4.0)^3 - (3.5)^3(1 - 0.125)}{12}$$

$$I_n = 2.207 \text{ in}^4$$

$$I_d = \frac{(1.0)(4.0)^3 - (3.5)^3(1 - 0.100)}{12}$$

$$I_d = 2.118 \text{ in}^4$$

$$\sigma_n = \frac{M_2 c}{I_n} = \frac{(17366 \text{ in}\cdot\text{lbs})(2.0 \text{ in})}{2.207 \text{ in}^4} = 15737 \text{ psi}$$

$$\sigma_d = \frac{M_2 c}{I_d} = \frac{(17366 \text{ in}\cdot\text{lbs})(2.0 \text{ in})}{2.118 \text{ in}^4} = 16370 \text{ psi}$$

Max stress is 42000 psi (ultimate) of 6061-T6

Margin of safety =  $\frac{\sigma_{max}}{\sigma_1} - 1 = 1.57 \therefore$  deviation is acceptable

## Moments of Inertia, Section Moduli, and Radii of Gyration (Continued)

Section	Area of Section, $A$	Distance from Neutral Axis to Extreme Fiber, $y$	Moment of Inertia, $I$	Section Modulus, $Z = I/y$	Radius of Gyration, $k = \sqrt{I/A}$
C-Sections					
	$dt + a(s + n)$	$\frac{d}{2}$	$\frac{1}{12} \left[ bd^3 - \frac{1}{8g} (h^4 - t^4) \right]$ $g = \text{slope of flange}$ $= \frac{h-t}{2(b-t)} = \frac{1}{6}$ for standard channels.	$\frac{1}{6d} \left[ bd^3 - \frac{1}{8g} (h^4 - t^4) \right]$	$\sqrt{\frac{\frac{1}{12} \left[ bd^3 - \frac{1}{8g} (h^4 - t^4) \right]}{dt + a(s + n)}}$
	$dt + 2a(s + n)$	$b - \left[ \frac{b^2 s + \frac{ht^2}{2}}{3} + \frac{g}{3} (b-t)^2 \right] + A$ $g = \text{slope of flange}$ $= \frac{h-t}{2(b-t)}$	$\frac{1}{12} \left[ 2sh^3 + \frac{1}{3} (b^4 - t^4) - A(b-y)^2 \right]$ $g = \text{slope of flange}$ $= \frac{h-t}{2(b-t)}$ for standard channels.	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
	$bd - h(b-t)$	$\frac{d}{2}$	$\frac{bd^3 - h^3(b-t)}{12}$	$\frac{bd^3 - h^3(b-t)}{6d}$	$\sqrt{\frac{bd^3 - h^3(b-t)}{12[bd - h(b-t)]}}$

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MOMENT OF INERTIA, SECTION MODULUS

## Moments of Inertia, Section Moduli, and Radii of Gyration (Continued)

Section	Area of Section, $A$	Distance from Neutral Axis to Extreme Fiber, $y$	Moment of Inertia, $I$	Section Modulus, $Z = I/y$	Radius of Gyration, $k = \sqrt{I/A}$
	$bd - h(b-t)$	$b - \frac{2b^2 s + ht^2}{2bd - 2h(b-t)}$	$\frac{2sh^3 + ht^3}{3} - A(b-y)^2$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
T-Sections					
	$bs + ht$	$d - \frac{d^2 t + s^2(b-t)}{2(bs + ht)}$	$\frac{1}{12} [ty^3 + b(d-y)^3 - (b-t)(d-y-s)^3]$	$\frac{I}{y}$	$\sqrt{\frac{\frac{1}{12} [ty^3 + b(d-y)^3 - (b-t)(d-y-s)^3]}{bs + ht}}$
	$\frac{h(T+t)}{2} + Tn + a(s+n)$	$d - \left[ \frac{3s^2(b-T)}{2} + 2am(m+3s) + 3Td^2 - h(T-t)(3d-l) \right] + 6A$	$\frac{1}{12} [T^3(T+3t) + 4bn^3 - 2am^3] - A(d-y-n)^2$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
	$bs + \frac{h(T+t)}{2}$	$d - \left[ \frac{3bs^2 + 3ht(d+s)}{2} + h(T-t)(h+3s) \right] + 6A$	$\frac{1}{12} [4bs^3 + h^3(3t+T)] - A(d-y-s)^2$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$

MOMENT OF INERTIA, SECTION MODULUS

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